

CLAIMS

We claim:

- 1) A method of coating a blood-contacting surface with a heparin-containing compound comprising:
- 5 a) applying a first hemocompatible coating to said surface wherein said first hemocompatible coating is sufficiently tightly bonded to said surface so as to remain on said surface in contact with blood; and,
- b) applying at least one second hemocompatible coating sequentially on said first hemocompatible coating wherein said at least one second hemocompatible coating comprises one or more therapeutic heparin-containing compounds releasable into blood.
- 10 2) A method as in claim 1 wherein said first hemocompatible layer includes a heparin-containing compound.
- 15 3) A method as in claim 1 further comprising roughening said surface prior to coating.
- 20 4) A method as in claim 1 further comprising applying a primer layer to said surface prior to applying said first hemocompatible coating, wherein said primer layer enhances adhesion of said first hemocompatible coating to said surface.
- 25 5) A method as in claim 4 wherein said primer layer is selected from the group consisting of heparin-containing compounds, ethylene vinyl alcohol copolymer, polycystine, polylysine and reactive silanes including trimethoxysilanes.
- 30 6) A method as in claim 4 wherein said primer layer contains at least one chlorosilane compound.

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7) A method as in claim 6 wherein said at least one chlorosilane has a functional head.

8) A method as in claim 7 wherein said functional head of said at least one chlorosilane has functionality selected from the group consisting of unsaturated functionality, amine functionality, carboxyl functionality.

9) A method as in claim 8 wherein said functionality is modified by polyethylene glycol or hyaluronic acid.

10) A method as in claim 7 wherein said at least one second hemocompatible layer comprises a plurality of layers and wherein said plurality of layers have varying properties.

11) A method as in claim 10 wherein said varying properties comprise varying compositions.

12) A material having a hemocompatible surface produced by the method of claim 1.

13) A medical device wherein at least one surface thereof contacts blood and wherein at least a portion of said blood contacting surface is the material of claim 12.

14) A medical device as in claim 13 wherein said medical device is an endoluminal stent.

15) A method of coating a blood-contacting surface with a heparin-containing compound comprising:

a) providing a formulation containing at least one heparin-containing compound and at least one adhesion enhancer; and,

b) coating said surface with said formulation.

16) A method as in claim 15 wherein said at least one adhesion enhancer is selected from the group consisting of polyethylene glycol , polyethylene oxide,
5 polyvinylpyrrolidone, polyvinyl alcohol, polycaprolactone, polyglycolic acid, ethylene vinyl alcohol copolymer, hyaluronic acid, polyurethanes, copolymers of polycaprolactone and polyglycolic acid, copolymers of polycaprolactone and polyethylene glycol, segmented polyurethanes and mixtures thereof.

10 17) A method as in claim 16 wherein said coating is performed by dip coating.

18) A method as in claim 15 further comprising roughening said surface prior to coating.

15 19) A material having a hemocompatible surface produced by the method of claim 15.

20) A medical device wherein at least one surface thereof contacts blood and wherein at least a portion of said blood contacting surface is the material of claim
20 19.

21) A medical device as in claim 20 wherein said medical device is an endoluminal stent.

25 22) A method of coating a blood-contacting surface with a heparin-containing compound comprising:

- a) roughening said surface prior to coating; and,
- b) coating said surface with a heparin-containing compound; and,
- c) baking said surface and said coating thereon sufficient to affix said
30 coating to said surface.

23) A method as in claim 22 wherein said baking is at a temperature from approximately 50 degree C to approximately 100 degree C.

24) A method as in claim 22 wherein said coating is performed by dip coating.

25) A method as in claim 22 wherein said roughening is performed by argon plasma etching.

26) A material having a hemocompatible surface produced by the method of claim 22.

27) A medical device wherein at least one surface thereof contacts blood and wherein at least a portion of said blood contacting surface is the material of claim 26.

28) A medical device as in claim 27 wherein said medical device is an endoluminal stent.

29) A heparin-containing composition for coating onto a blood-contacting surface comprising ethylene vinyl alcohol copolymer, at least one heparin complex, dimethyl sulfoxide and tetrahydrofuran.

30) A heparin-containing composition as in claim 29 further comprising dimethyl acetamide.

31) A heparin-containing composition as in claim 29 wherein said ethylene vinyl alcohol copolymer is about 2.2% by weight of said composition.

32) A heparin-containing composition as in claim 31 wherein said heparin complex is from about 0.6% by weight to about 2.3% by weight of said composition.

33) A heparin-containing composition as in claim 30 wherein said ethylene vinyl alcohol copolymer is about 2% by weight of said composition.

5 34) A heparin-containing composition as in claim 31 wherein said heparin-complex is from about 1.1% by weight to about 2.0% by weight of said composition.

10 35) A medical device wherein at least one surface thereof contacts blood and wherein at least a portion of said blood contacting surface is coated with the material of claim 29.

15 36) A medical device as in claim 35 wherein said medical device is an endoluminal stent.